LUBE-TECH

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DIESEL-ENGINED MOTORCYCLES

INTRODUCTION

On initial consideration, the use of diesel engines in motorcycles would not appear to be an ideal application for this type of power unit. Due to space and size limitations, typical motorcycle power units are relatively compact, light and with high specific power outputs, whereas in the past the use of diesel engines has been generally been confined to relatively large and heavy commercial applications, off-road equipment, railroad use and a variety of stationary applications where size, weight and specific power outputs are not primary considerations.

However, times change.

Current developments in diesel engine technology for automobile use have resulted in power units of unprecedented refinement and fuel efficiency. Their use has escalated markedly over the past few years and their popularity is increasing. The Society of Motor Manufacturers and Traders estimates that this year 28% of all cars sold in Britain will be diesel-powered; i.e. doubling their market share in just three years. Concerns over the health aspects of diesel emissions are being overcome, with Audi now confident that their diesel cars will meet the latest round of stringent EU emission legislation, Euro IV, which will become mandatory in 2005.

The use of diesel engines in motorcycles is also now receiving renewed attention due primarily to two main driving forces, i.e. military use and environmental considerations.

However, the design of motorcycle power units and transmission systems have been developed and refined to such an extent that since they now bear even less resemblance to their automotive counterparts, even requiring their own specialised lubricants. The 'tailoring' of a diesel engine expressly intended for motorcycle use has only recently received serious consideration. Two examples of the successful application of diesel engines in motorcycles are covered in more detail below.

HISTORICAL BACKGROUND

With a few exceptions, the application of diesel engines in motorcycles in the past has been confined to a number of one-off 'specials' constructed by enthusiasts.

For example, in the late forties, F.E.Sidney of Rottingdean, took a prewar Norton model 18 and designed a direct injection diesel single to power it. Although it was rumoured that the motorcycle manufacturer had active interest in the project, in reality it amounted to nothing but a single bike that ran on diesel, and apparently quite well.

Other one-off projects, both historical and current, include the following:-

In the U.S. Harold Benich, of Albion, Pa spent over two years and $15,000 building a Harley-Davidson Fat Boy motorcycle from mail-order parts and an old diesel engine. It is believed to be the nation's first motorcycle to run entirely on soybean oil, according to the National Biodiesel Board in Jefferson City, Mo.

In France, another promising dieselling phenomena which however came to nothing was the Boccardo, powered by the engine of the Citroën Visa AX, the successor of the famed 2CV, mated to a Guzzi Gearbox; this being the brain child of designer Louis Boccardo.

In Germany, Jurgen Schuster built a mammoth 1000 cc turbocharged Cortenbach motorcycle. The engine, developing up to 45 bhp, runs equally well on jet-fuel or vegetable oil at a rate of 3.4 l/100km. Planned developments included machines developing between 60-90 bhp and consuming 2-2.5l/100km if sufficient funds became available.

Brian Hickson built a motorcycle using a Kubota diesel engine and other parts donated from a Mini, a Toyota Corolla, Honda and Suzuki. The machine reached 87 km/hour and costs less than 1p/km on fuel to run.

However, a name that will always be associated with the first truly successful commercial application of diesel engines in motorcycles is that of Ernie Dorsett, now retired but formerly a maintenance engineer at the Dairy Crest Creamery near Telford, Shropshire. Always a motorcycle enthusiast, Ernie, a skilled engineer, became interested in the possible application of diesel engines for two-wheeled use. In the late 1970's he obtained a Petter AA1 engine from a concrete mixer and, as a spare-time project over a number of years, built this into a mixture of cycle parts, including a frame from an Ambassador, a primary chaincase and gearbox from a BSA C11G, Honda wheels and forks, a fuel tank from a Matchless and a seat from a BSA. The 211 cc engine developed 3.5 bhp at a governed 3600 rpm, and would cruise comfortably at 35-40 mph. He proved the viability of the machine by travelling from John o' Groats to Lands End in 1984 with one overnight stop in Telford, averaging some 120 mpg for the journey.

This was a remarkable achievement considering the basic limitations and general unsuitability of the power unit. However, the ensuing publicity attracted the interest of the importers of the Fuji diesel engine, who donated a 300 cc 'Robin' engine for Ernie to use as the basis for his next project. This engine he incorporated into a Matchless rolling chassis, and this machine was even more successful, embarking on a number of overseas tours including Finland, France and Germany.

The Fuji importers then provided a 412 cc DY41 engine which he again incorporated into running gear from a Matchless. This machine was even more successful achieving some 230 mpg under steady riding conditions. It would cruise comfortably at 55 mph with a maximum of some 65 mph which could be extended to 70 mph under favourable conditions, the engine being governed to 3600 rpm.

Contrary to initial concerns, the machine could be kick-started easily in spite of the high compression ration, due to the inertia stored in the heavy flywheel. The engine could be turned over the compression stroke by using a valve-lifter, and a conventional kick-starting technique spinning the heavy flywheels over the next compression stroke, would be sufficient to start the engine. This machine, which is still in existence, has now covered over 100,000 miles without the engine ever having received any attention apart from the usual routine maintenance. Four more of these machines were built to special order.

With the demise of the UK motorcycle industry, donor machines of basic design were becoming in short supply, so Ernie turned his attention to using Royal Enfield Bullet motorcycles which were being (and are still) manufactured in India and imported into the UK. Initially, complete motorcycles were used as donors, with the engines being sold off, but later an arrangement was made with the importers to supply Ernie with the motorcycle less engine, for subsequent conversion using the Robin diesel power unit. The demand outstripped Ernie's limited home-based production facilities, so manufacture was outsourced, although Ernie personally inspected all machines prior to sale. Some 125 machines were so produced, with 20 being exported to Japan! Eleven MZ motorcycles were also used as donors in addition to the Enfields.

One notable achievement by one of his diesel-powered Indian Enfield was an entry into the Guinness Book of Records, when the machine was ridden 24 hours a day for one week from 22 –29 June 1995 by a team of riders, covering 3609.88 miles and averaging 201.08 mpg. It was considered that even this remarkable fuel economy could have been bettered if the riders involved had had more experience in riding diesel-powered machines.

By this time, electric starting had become standardised, but even then, it was possible to downsize the battery from the recommended 35 amp/hr to one of 14 amp /hr which was still more than sufficient for cold-starting purposes. Also, the US manufactured 'Comet' CVT transmission units were incorporated into later production.

With the increasing popularity of the use of motor scooters, it was particularly interesting that at one point Ernie fitted an East German 'Simpson' scooter with a 250 cc Robin engine. However, this machine was sent back to Germany and there has been no further news of its success or otherwise. This type of vehicle could well meet the needs of the commuter in congested areas and would also be extremely cheap to operate.

The last machine to be so modified was a

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